Case Study: Wetumpka, AL

December 9, 2015

Overview

In the spring of 2014, the U.S. Environmental Protection Agency, Region 4 - Atlanta (EPA R4), and the Alabama Department of Environmental Management (ADEM) assembled a team to conduct an Energy Management Initiative (EMI) for Alabama Water and Wastewater Utilities. In August 2014, Ronnie Windham, General Manager of Water and Sewer Board and Chris Bowar, Wastewater Superintendent, accepted the invitation to be one of the ten utilities to participate in the EMI.

About the City of Wetumpka

Wetumpka is a city of approximately 6,500 in Elmore County. Situated along the Coosa River, Wetumpka is known as the City of Natural Beauty. Wetumpka has a rich cultural history and is the site of the internationally recognized Wetumpka Crater, Jasmine Hills Garden, Fort Toulouse, and the Wind Creek Casino. Home to beautiful white water rafting, the City has also made its mark by becoming a location for film making, with Big Fish and other great movies taking advantage of Wetumpka's history and beauty. The Wetumpka Water & Sewer Board provides water and sewer services to the City and several Department of Corrections facilities.

Wetumpka Wilako Wastewater Plant

The Wilako Wastewater Treatment Plant (WWTP) treats approximately 1.5 million gallons per day (mgd) of municipal wastewater with an influent BOD_5 of approximately 150 mg/l. The plant uses an extended air activated sludge treatment process and is designed to treat up to 4.5 mgd at average daily flow conditions. The plant has two 3.4 million gallon aeration basins two 0.5 million gallon final clarifiers. The final effluent is discharged two miles away to the Coosa River, downstream of the confluence of Calloway Creek. The monthly average NPDES effluent limits for $CBOD_5$, total suspended solids, and ammonia nitrogen are 25, 30, and 10 mg/L, respectively. The WWTP consistently produces a high quality effluent with $CBOD_5$ values averaging less than 2 mg/l, TSS values averaging 3 mg/l, and NH_4-N averaging less than 0.04 mg/L.

Optimizing Operations: Energy Savings

Plant aeration is provided by twelve 75-hp high speed vertical turbine aerators, with each aerator operating six hours per day. Each basin also has two 40-hp mixers, operating 11 hrs per day. The team identified that the treatment system could be optimized by operating only one aeration basin. Also, the dissolved oxygen (DO) control system could be further optimized by operating only two 75-hp aerators and two 40-hp mixers for 18 hours per day. Shutting off the aerators in the single basin mode, with appropriate DO control setpoints, now forces the plant to run anoxically (without oxygen) for 4-6 hours per day. This process and control system change was made with no capital outlay yet saved $70,000 by reducing power usage by 460,000 kWh/year.

Not Just Saving Energy!

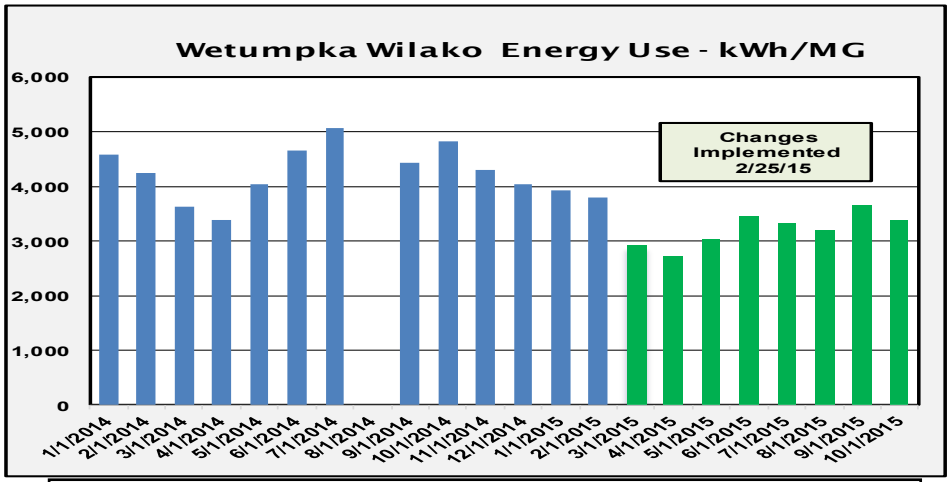
Wetumpka has realized savings in energy cost by changing its plant operation to optimize aerator efficiency–incurring lower power (kWh) used per million gallons treated. Close operator oversight was necessary to implement this energy savings initiative, and Wetumpka's operators do an excellent job keeping the plant running at peak efficiency. The change in operating scheme has also yielded other benefits to the environment: reducing the amount of nitrogen in plant effluent by 12 tons per year and dramatically reducing green house gas generation. Plant management continues to seek additional ways to implement energy savings by addressing plant lighting and upgrading aerobic digester equipment and controls.

Wetumpka Wilako WWTP

Results Summary (achieved at no implementation cost):

- **Energy Savings:** 24% in kWh/MG
- **Annual Rate of Cost Savings:** $70,000 *
- **Cumulative CO2 Reduction:** Over 390 Tons/year *
- **Effluent Nitrogen Reduction:** 12 Tons/year (62%) *

* Values are 8 months actual, 4 months projected



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